

ARGENTINE WEATHER.

By HERBERT L. SOLYOM. Dated Buenos Aires, January 9, 1909.

The scientific world in general hears so little of the meteorology of intertropical South America that every detail of articles concerning it deserves careful consideration. Hence it may not be out of place to call attention to one or two misapprehensions which might be originated by Prof. R. DeC. Ward's article on government meteorological work in Brazil, which appeared in a recent number of the MONTHLY WEATHER REVIEW,¹ even though these misapprehensions would be insignificant in connection with the meteorology of a better known region.

To one accustomed to study daily the Brazilian observations the implication that the weather changes in southern Brazil from Rio de Janeiro southward, are independent of the observed condition in the northern States of the Republic, and the statement that the rain of July 16-18, 1908, at Rio was associated with a weak cyclonic area whose influence did not extend much nearer the equator than Rio itself, are clearly in error though they would probably be accepted without question by most readers of the article.

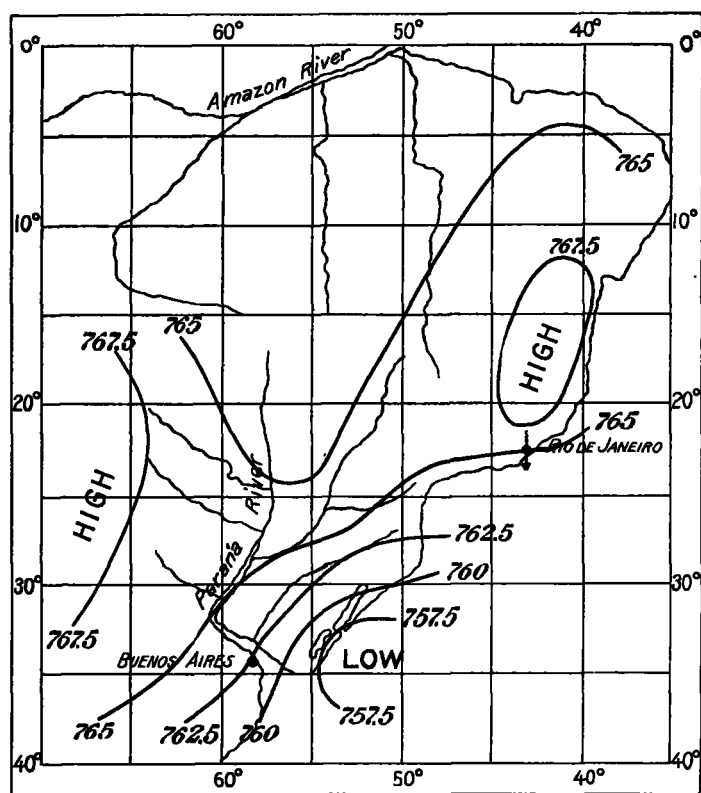


FIG. 1.—Weather Map of South America, July 13, 1908, 8 a. m. Cordoba time.

If one charts with the daily observations from the Brazilian stations, those from an equal or greater number of representative stations in the adjacent countries of Paraguay, Uruguay, and Argentina there results an intelligible weather map of this part of the continent, even though the great interior of Brazil is very inadequately represented and though there is a discrepancy of sixteen minutes between the observation hours of Brazil and Argentina.² The pressure distribution derived from a series of such maps extending over the period treated by Professor Ward, is presented on the outline maps forming figs. 1 to 8 of this paper. The isobars have been drawn for intervals of 2.5 millimeters, corresponding closely to the inter-

¹ See Monthly Weather Review, August and September, 1908, 36:254-6, 290-2, Chart IX, (xxxvi-95).

² 8 a. m. Cordoba time is 12:16 p. m. Greenwich time.

val of the daily maps published by the U. S. Weather Bureau. In preparing these maps the barometric readings at Cuyabá, Jonzeiro, Victoria, and Bagé have been subjected to a nearly constant correction. The necessity for this becomes apparent after a study of a large number of maps and is thought to be due to either a large but unapplied instrumental error or more probably to the inaccurate determination of the sea-level altitudes of the stations. In the light of these additions and alterations the maps seem to show the following course of meteorological events during the middle of July, 1908.

On July 13, a well developed low pressure area, which had been causing moderate rains over a large area in eastern Argentina, is shown in fig. 1 to be moving out to sea across the coast of Uruguay. In spite of the near approach of this storm which was then causing rains at the southern Brazilian stations, the weather at Rio continued fair owing to the presence in northern Brazil of an irregular high pressure area with its center about latitude 16° S. and longitude 42° W. In the far western part of the map the anticyclone had just appeared which dominated the weather of the ensuing week.

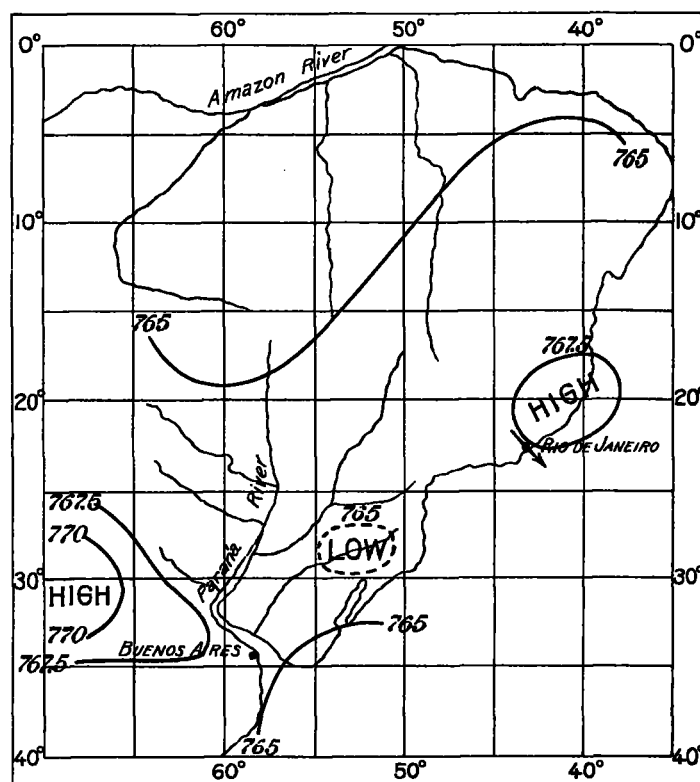


FIG. 2.—Weather Map of South America, July 14, 1908, 8 a. m. Cordoba time.

By the morning of the 14th the anticyclone of northern Brazil had contracted and moved slightly toward the south and east. At Rio the land wind continued and the vapor pressure was falling. The anticyclone of Argentina was increasing in intensity and spreading eastward while there is evidence that a shallow depression was developing in southern Brazil between two high pressure areas. On the morning of July 15 (see fig. 3) this depression appeared as a small, but well-defined cyclonic area and had begun to move eastward. The anticyclone in Brazil had disappeared leaving a region of uniform pressure in front of the new low-pressure area, while the high area over Argentina developed rapidly and drifted eastward. The definite pressure rise had begun at Rio, the wind had just shifted to the south and the vapor pressure was beginning to increase.

Between the 15th and the 16th the pressure rose steadily

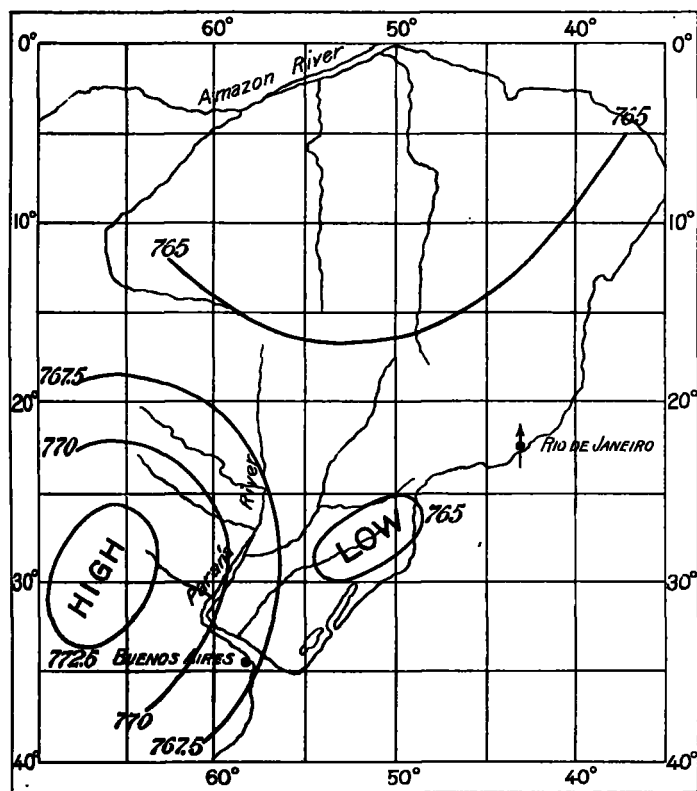


FIG. 3.—Weather Map of South America, July 15, 1908, 8 a. m. Cordoba time.

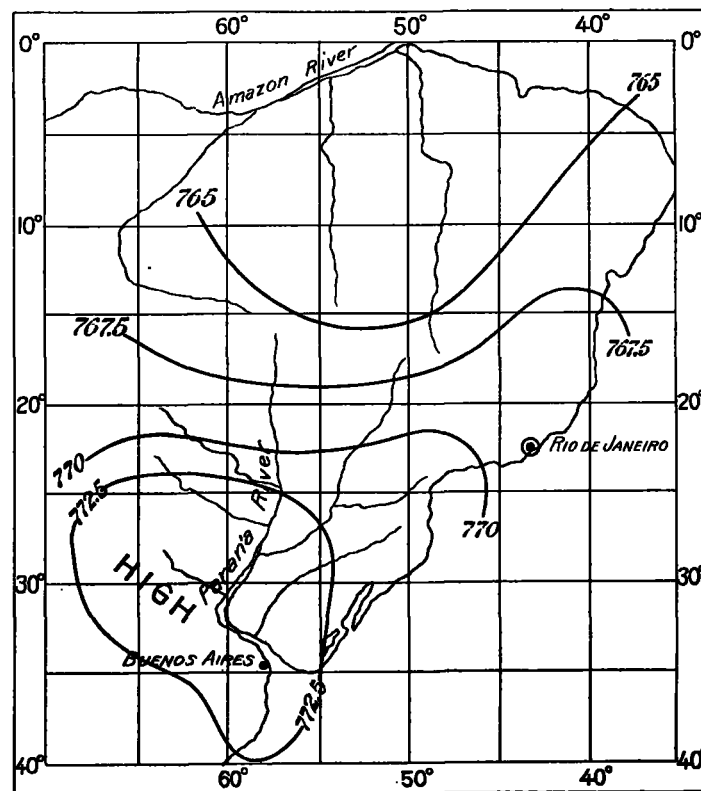


FIG. 5.—Weather Map of South America, July 17, 1908, 8 a. m. Cordoba time.

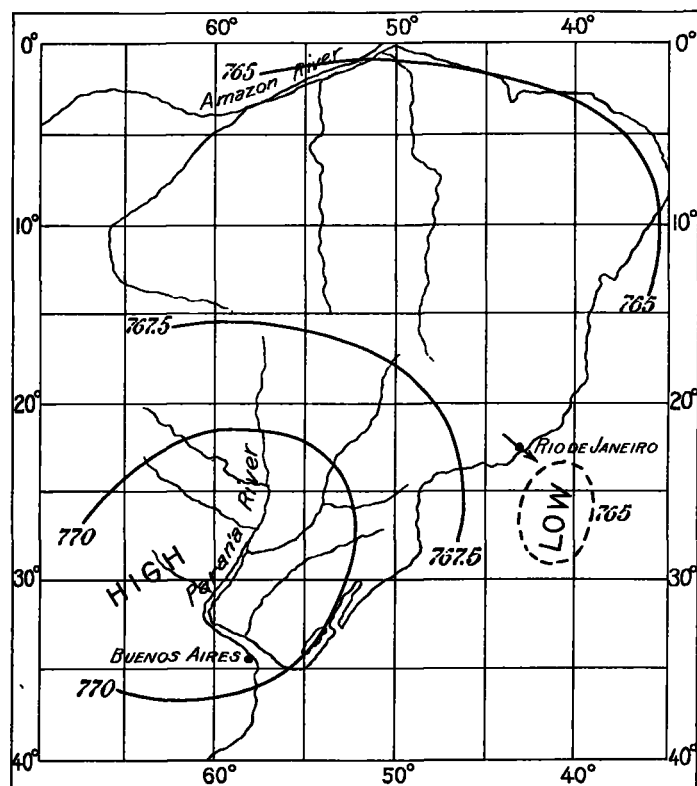


FIG. 4.—Weather Map of South America, July 16, 1908, 8 a. m. Cordoba time.

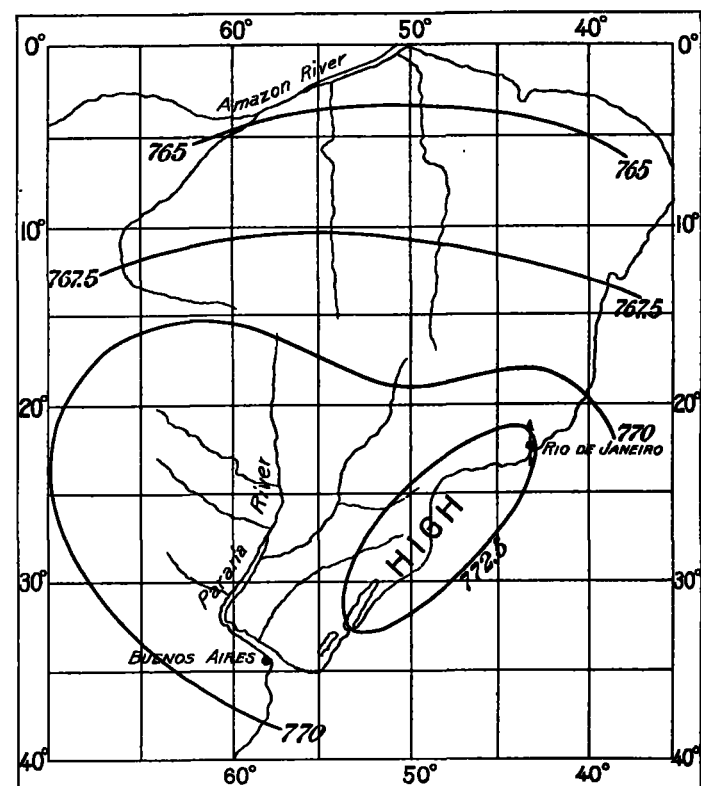


FIG. 6.—Weather Map of South America, July 18, 1908, 8 a. m. Cordoba time.

throughout Brazil, Paraguay, Uruguay, and eastern Argentina so that on the morning of the 16th (see fig. 4) the whole region embraced by the map was definitely within the area of the western anticyclone. The Brazilian low pressure of July 15th can not be placed on this chart "somewhere to the west-

ward of Rio," as described by Ward. The only position that can be plausibly assigned to it, in order to account for the anomalous northwest wind at Rio de Janeiro, is that shown by the dotted closed isobar immediately south of that station; but this location is purely hypothetical while the fact that the vapor

pressure continued high and the cloudiness increased seems to indicate that this northwest wind was only local and temporary. In the latter case the low area must have filled in completely, or have moved rapidly to the east or southeast beyond the area of observations.

On the afternoon of July 16, rain began to fall at Rio, presumably with a return of the wind to the south and a continued rise in pressure as the anticyclone moved eastward.

should also be remarked that the criticisms directed against the Brazilian Meteorological Service, e. g., failure of telegraphic reports to arrive on time, insufficient number of observing stations, the limited nature of the forecasts, etc., are simply those which would apply to any young service in a sparsely populated territory and will undoubtedly disappear in time. There are, however, one or two defects in the Brazilian system apparently not associated with the growth of the service.

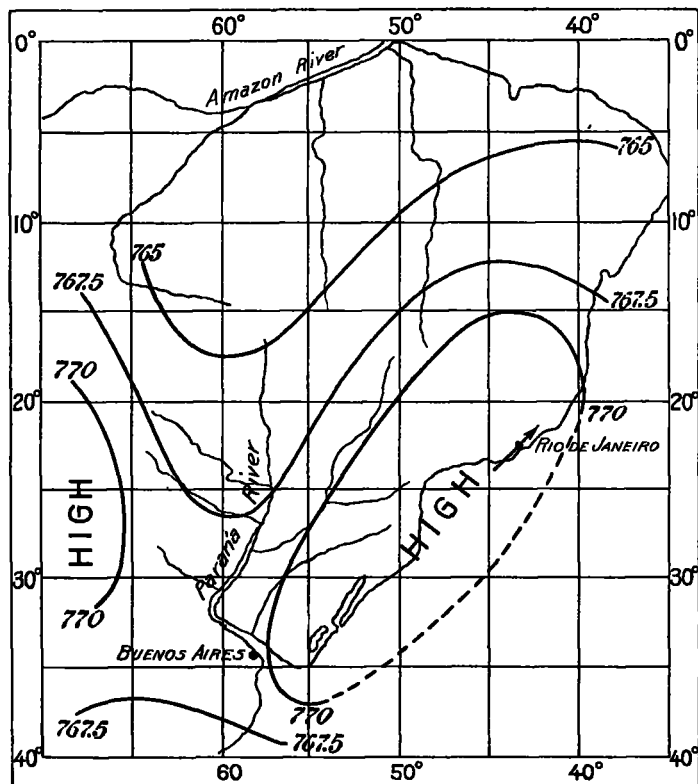


FIG. 7.—Weather Map of South America, July 19, 1908, 8 a. m., Cordoba time.

The weather maps for July 17 and 18 (see figs. 5 and 6), show that the high-pressure area advanced steadily toward the coast, but that on the morning of the 18th it changed the direction of its advance to northeastward and followed along the coast until July 20. As the center of the high area approached the rain at Rio ceased and the sky began to clear. On the 20th the center of the anticyclone was located slightly to the south and west of Rio de Janeiro (see fig. 8), and a new low pressure had developed in central Argentina.

Thus the only influence that Professor Ward's "weak cyclonic area" had on the rain of July 16 to 18 at Rio de Janeiro seems to have been to delay its start by holding the winds in the northern quadrant for from twelve to twenty-four hours longer than they would otherwise have remained there. Furthermore, the rain which would naturally have resulted at Rio from the passage of a well-developed storm on July 13 was averted by the presence of a weak anticyclone in northern Brazil.

It is proper to here draw attention to the fact that a very large percentage of the rainfall in eastern South America occurs with a rising barometer and southerly winds whether this condition be produced by the recession of a low pressure or the advance of a high pressure. The rainfall is greatest when a low center is closely followed by a high.

It is true that the changes in pressure and temperature are but slight in northern Brazil, but they form a useful index to the probable course of atmospheric disturbances in higher latitudes and they should by no means be discarded. It

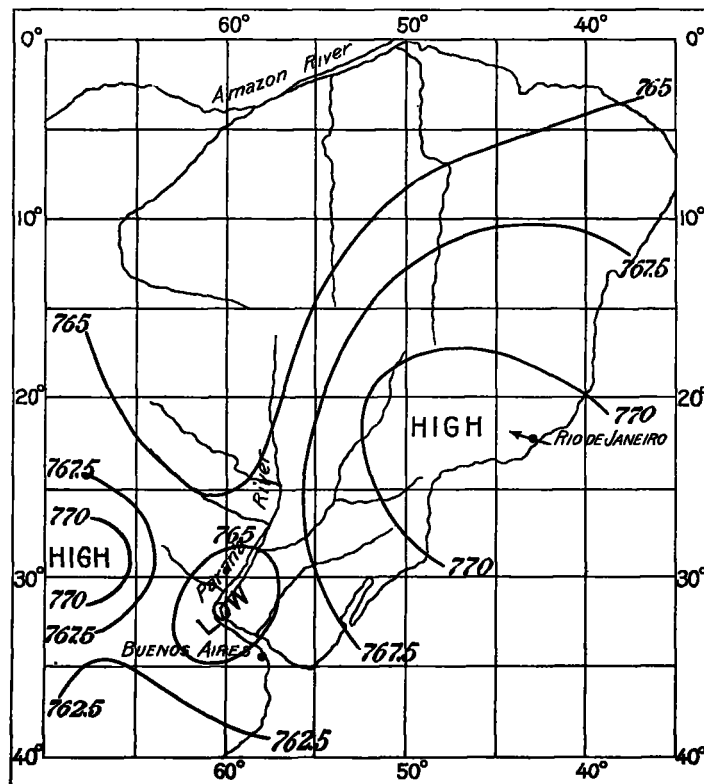


FIG. 8.—Weather map of South America, July 20, 1908, 8 a. m., Cordoba time.

These are the partition of the work among different government departments, the lack of effective cooperation between the national service and those of the individual States, and finally, the adherence to station pressures, instrumental constants and reduction tables which combine to give the isobars of the map weird contours dissimilar to anything observed in other countries, with barometric gradients out of all proportion to the observed wind velocities.

In conclusion, I would call attention to the fact that since the middle of November, 1908, the Brazilian Daily Bulletin has been substantially improved. It is now printed from type, includes the wind and cloud data and special comments opposite each station, and the map is reserved exclusively for the isobars which are drawn at 2- or 3-millimeter intervals.

THE SPECIFIC GRAVITY OF SNOW.

By M. E. J. GHEURY, F. R. A. S. Dated Eltham, England, March 4, 1909.

The following determinations of the specific gravity of snow were made at Eltham, England, during the winter of 1908-9. The samples for weighing were collected, usually in duplicate sometimes in larger numbers, from different parts of a flat roof by cutting out rectangular blocks of definite dimensions. These blocks were then weighed and the specific gravity computed. Some earlier determinations of the specific gravity of snow, will be found in the MONTHLY WEATHER REVIEW for December, 1907.¹

¹M. E. J. Gheury: The specific gravity of snow. Monthly Weather Review, 1907, 35:583.